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WHY THE UNITED STATES UNDERESTIMATED THE SOVIET BW THREAT

by

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September 2006

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WHY THE UNITED STATES UNDERESTIMATED THE SOVIET BW THREAT

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ABSTRACT

Biological weapons have the ability to inflict mass casualties while keeping existing infrastructure intact. They are inexpensive to manufacture, difficult to detect, and have a low signature for attribution. In the 1970s, the Soviet Union began amassing the largest stockpile of biological weapons worldwide. The U.S. Intelligence community repeatedly failed to detect the scope and character of this large-scale Soviet development effort despite implausible explanations for outbreaks of unexplained disease, credible ground reports from informants, and strange behavior patterns viewed through reconnaissance efforts. Toward the end of the Cold War, the U.S. Intelligence realized its grave error. Unfortunately, the majority of these weapons are unaccounted for today. By examining the reasons the Soviet Union's biological weapons program went undetected, the United States may gain a better advantage for future assessments and prevent the large-scale stockpiling and development of biological weapons.

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I. INTRODUCTION

A. BACKGROUND

Following the Cold War, the Soviet Union possessed the world's largest stockpile of biological weapons (BW), like plague, anthrax, and smallpox, researching, developing, and producing these weapons without the knowledge of other nations. How did the United States completely underestimate the Soviet Union's capability to produce and stockpile these weapons? What conditions in the Soviet Union led the United States to underestimate the Soviet's research ability? How did the security institutions within the Soviet Union inhibit intelligence the United States had on the Soviet's BW program? Even after accidents within the Soviet Union at BW facilities, how did the United States fail to update its assessments of the Soviets?

B. WHY BW ARE SO WORRISOME

Biological weapons present a threat far different from nuclear or chemical weapons. Whereas nuclear and chemical weapons have a limited area and time of affect, some BW can remain in the target population for long periods. If a BW is not detected in time, a release in a major metropolitan area can spread the BW agent worldwide if it is a contagious agent. Biological weapons comprised of living bacteria, virus, or fungi can also mutate from generation to generation. With mutation, new biologic properties evolve to ensure the survival of the organism, making them immune to antibiotic and antiviral treatments. This can quickly create an organism that is uncontrollable or uncontainable. The H5N1 variant of the flu, commonly referred to as Bird Flu, has the potential to kill millions of people in a pandemic, and it is not even a BW. The final class of BW are toxins. Toxins are potent poisons created from living matter, ricin and botulinum toxin are two examples.

Biological weapons are also very worrisome because of the small infrastructure necessary to create a BW program. A successful BW program can be contained in a very small area with a few well-trained workers.

A nuclear-weapon program requires a great deal of resources. Special equipment, such as high-precision centrifuges designed for enriching uranium, that cannot be

mistaken for any other use must be obtained.[1] Special alloys are required to construct this equipment. Thousands of highly skilled scientists are required to outfit a nuclear program. Moreover, the acquisition of fertile material and fissile material is needed to create the bombs. All the components of a nuclear program cost millions of dollars. In addition, almost every aspect of a nuclear program is closely monitored by the international community, and it is extremely difficult to hide for any amount of time. Nuclear reactors are not small, and they provide a distinct signature that can be easily detected via technical means, such as thermal imaging or air sampling.[2] For example, the nuclear power plant at Yongbyon in the Democratic People's Republic of Korea was detected operating shortly after it restarted its program. The North Koreans, cunning and deceptive adversaries and superb in denial techniques, could not hide their nuclear facility, yet the United States is unclear on the extent of North Korea's BW capability.[3]

Chemical weapons also provide a rather large footprint when one starts or continues a program. Again, special equipment is necessary for the production of chemical weapons. Special alloys are required for the pipes and vats of chemicals to prevent corrosion during the manufacturing process. Also, like a nuclear program, a great number of scientists working together in heavy industry is required to manufacture chemical weapons. The number of people required is significantly less than a nuclear program, but it still requires hundreds to produce a usable quantity of chemical weapons. Like a nuclear program, a successful chemical weapons program requires millions of dollars to implement.[4] Seed chemicals are needed and under the Chemical Weapons Convention (CWC) many of the chemicals required to create chemical weapons are monitored by the international community.[5] The CWC has established the most robust and intrusive inspection regime to inspect a suspected chemical weapons facility in a very

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[1] Joseph Cirincione, Jon B. Wolfsthal, and Miriam Rajkumar, *Deadly Arsenals: Nuclear, Biological, and Chemical Threats* (Washington, D.C.: Carnegie Endowment for International Peace, 2005), 51.

[2] Ibid, 45.

[3] Central Intelligence Agency (CIA), *Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, 1 January Through 30 June 1998,* CIA Electronic Reading Room (10 May 1999), CIA-FOIA, 5.

[4] Federation of American Scientists (FAS), "Chemical Weapons Technology," http://www.fas.org/irp/threat/mctl98-2/p2sec04.pdf (accessed August 25, 2006), II-4-8.

[5] Cirincione, Wolfsthal, and Rajkumar, *Deadly Arsenals*, 435-437.

short amount of time. Chemical weapons plants also have large footprints that can be detected via technical means similar to those of a nuclear facility. Undoubtedly, concealing a chemical weapons facility within a legitimate chemical processing plant for industry or agriculture is possible. For example, phosgene was a chemical weapon used extensively in World War I. This chemical has industrial applications for paint removal and as a solvent, but it also possesses deadly properties as a choking agent.[6]

Because of the recent advances in biotechnology, a BW program requires far fewer personnel than a nuclear or chemical weapons program. A BW program can be created with scores of people, and not the multitudes required for nuclear and chemical weapons programs. These advances in biotechnology also allow the scientists to create increasingly lethal BW agents in a smaller space and with fewer resources.

In a nuclear program a vast amount of material is required to complete each weapon. Even though only a few kilograms of plutonium or uranium is required, the process to obtain weapon-grade ingredients requires a great deal of fertile matter. Weapons-grade fissile material must be extracted from spent reactor fuel or enriched by centrifuges or other extremely technical means.[7] This is a complex process.

A BW requires only a fraction of the material needed for the other programs to be effective. Depending on the agent, a BW can multiply and grow on its own. Advanced equipment, such as bioreactors and fermentors that can be used to create a BW is commonly available. Computer-controlled bioreactors and fermentors can even be purchased on the Internet. Unlike the millions of dollars for nuclear and chemical programs, a BW program costs less than $10,000 to have a state-of-the-art system ready to generate a lethal BW. In addition, bioreactors and fermentors are not strictly regulated. Surprisingly, they are available anonymously through popular auction websites.

The required materials to create the BW agents are also commonly available. These components are not as strictly regulated as the components for nuclear and chemical weapons, even though the security requirements for purchasing infectious

[6] FAS, "Chemical Weapons Technology," II-4-8.

[7] Cirincione, Wolfsthal, and Rajkumar, *Deadly Arsenals*, 49.

agents have become restricted significantly since 2001. Nevertheless, today biology supply stores can provide seed stock for bacteria and viruses that could be weaponized. This would be the quickest source for a bio-terrorist to acquire agents for a homemade lab. Furthermore, a state-sponsored program can acquire BW agents because many bacteria and viruses exist naturally all over the world. Anthrax and plague are likely in nature in most countries with BW aspirations. Fortunately, the most feared potential BW agent, "variola virus," commonly known as smallpox, has been eradicated from nature. Only two legal repositories, one in the United States and one in Russia, of the variola virus exist, for prophylactic research purposes only. The Soviets have allegedly weaponized tons of smallpox and the whereabouts of this virus is unknown.[8]

With the explosion in modern biotechnology, the easy acquisition of materials, and the low number of personnel required to create a BW, a malefactor can readily produce such a program. In addition to the gains in technology for producing quantities of agents, the technology for modifying these same agents has also progressed. In nature, anthrax, plague, and ebola are extremely deadly. Genetically altering these agents to increase their virulence and resistance is a reality that must be addressed. Eventually, it may even be possible to create a new virus that has never been seen before, much like a computer virus, except with deadly consequences.[9]

Understanding the potential capabilities of current adversary states with respect to BW is critical. The United States not only underestimated the Soviet BW program, but underestimated the programs of South Africa and Iraq pre-1991. The only instance in which the United States overestimated a BW threat was that of Iraq leading up to the 2003 Operation Iraqi Freedom.

C. LITERATURE REVIEW

The unclassified literature on what the United States actually knew about the Soviet BW program is rather sparse. The declassified documents available from the Central Intelligence Agency (CIA) begin with a massive report on the Soviet BW program in 1961. This CIA report for senior policy makers began by stating that

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[8] Ken Alibek with Stephen Handelman, *Biohazard* (New York: Dell Publishing, 1999).

[9] Phillip Cohen, "A Terrifying Power," *New Scientist*, (January 30, 1999), http://online.sfsu.edu/~rone/GEessays/TerrifyingPower.html (accessed September 14, 2006).

insufficient evidence existed to assess an offensive BW program in the Soviet Union.[10] The document, however, did say that there were sufficient facilities that could possibly support an offensive BW program. The concern that the Soviet Union might possess the capability to support an offensive program is common throughout each of the subsequent CIA reports. None of the subsequent reports provides conclusive evidence of a BW program. The reports only speculate on the threat by assessing the level of Soviet science. Even after the well-known release of anthrax in the city of Sverdlovsk, the CIA grudgingly accepted the Soviet's explanation of the anthrax epidemic.

In 1989 the first breakthrough in the Soviet BW program occurred when Vladimir Pasechnik defected to the British Secret Intelligence Service (MI6).[11] He provided British and U.S. intelligence information on his work at the Institute of Ultrapure Biopreparations in Leningrad (contemporary St. Petersburg). In addition to the defection of Pasechnik, Ken Alibek defected to the United States several years later and expanded the U.S. knowledge of the Soviet program. Alibek was the First Deputy Chief of Biopreparat, the "civilian" organization constructed to develop BW. After Alibek defected, he wrote the book *Biohazard*, which detailed the extent of the Soviet BW program. His revelations detailed a massive program for creating a myriad of agents and delivery systems, including warheads on strategic missiles.[12]

Additionally, Igor Domaradsky published *Biowarrior* in Russia after the collapse of the Soviet Union, describing his role in the BW program.[13] His work is important because he chose to remain within Russia when he published, and his book references Ken Alibek's book and corroborates much of Alibek's claims about the extent of the Soviet BW program. Domaradsky does not make the same allegations regarding the preparation to use these weapons in a strategic sense, but emphasizes the scientific aspects of these weapons.

The other literature on BW reference either Alibek or Domaradsky extensively. This other literature includes, but is not limited to: *The Plague Makers*, *Deadly Arsenals*,

[10] CIA, *The Soviet BW Program,* CIA Electronic Reading Room (24 April 1961), CIA-FOIA, iii.

[11] Igor V. Domaradskij and Wendy Orent, *Biowarrior* (New York: Prometheus Books, 2003), 271.

[12] Alibek with Handelman, *Biohazard*, 5.

[13] Domaradskij and Orent, *Biowarrior*.

Deadly Cultures, The Worldwide Biological Warfare Weapons Threat, and "The 1971 Smallpox Epidemic in Aralsk, Kazakhstan, and the Soviet Biological Warfare Program."[14] This literature expands the scope of the Soviet BW program by describing and examining the activities surrounding the events described by Alibek and Domaradsky.

D. THE WAY AHEAD

1. The Soviet BW Program 1930 to 1968

Several factors led the United States to underestimate the Soviet BW program during the period from 1930 to 1968. One of the major factors that contributed to the U.S. perception of the Soviet BW program was the state of Soviet science starting shortly after Stalin gained power. Science in the Soviet Union was subverted by Trofim Lysenko, a Soviet pseudo-scientist, with the blessing of Stalin. Instead of science remaining objective, Stalin mandated that Communist ideology had to be involved. Biology and genetics were two of the sciences that were foremost affected by the corruption of objectivity. For example, Communist ideology was a contrived and required element of all Soviet science, researching and developing theories based on the scientific method embraced by the West was considered incompatible with Soviet thought.

In addition to the influence that Lysenko had on the sciences, there was a lack of scientific publications in circulation throughout the Soviet Union. Without indigenous journals, evaluating the development of a state's scientific advancement is difficult. Not only was there a lack of scientific journals, but scientists were forbidden to publish in foreign journals.

The Soviet security services during this time were among the best in the world. They were excellent at gathering intelligence and practicing counter-intelligence. The NKVD (the Soviet state security service) and later the KGB exercised immense control over the population in general and especially over foreign visitors. A strict system of

[14]Wendy Barnaby, *The Plague Makers* (London: Vision, 1999). Cirincione, Wolfsthal, and Rajkumar, *Deadly Arsenals.* Mark Wheelis, Lajos Rozsa, and Malcom Dando eds., *Deadly Cultures* (Cambridge, MA: 2006). Department of Defense (DOD), *The Worldwide Biological Warfare Weapons Threat* (2001). Jonathan B. Tucker and Raymond A. Zilinskas eds., "The 1971 Smallpox Epidemic in Aralsk, Kazakhstan, and the Soviet Biological Warfare Program," *Center for Nonproliferation Studies Occasional Paper,* no. 9 (2002).

internal passports limited travel in the Soviet Union making it difficult for citizens to travel, and even more difficult for visitors. To isolate areas of the Soviet Union from visitors, some cities were closed and became the main focal points of scientific activity in the Soviet Union for secret research programs.

The Soviets were also very adept at hiding their programs in plain sight. They used physical deception methods in order to change the visual signature of facilities. These methods allowed the Soviets to misrepresent facilities in photos taken by spy planes and later satellites capable of taking detailed pictures of the suspected sites.[15] Dual-use facilities also aided the Soviets in their ability to hide their program. These facilities originally started out as the Anti-Plague Institutes. Later vaccine production facilities were also established to be BW factories on short notice in case vast quantities of BW agents were needed.

2. Case Studies

In 1971 an outbreak of smallpox occurred in Aralsk, Kazakhstan, which was kept secret, even from the World Health Organization (WHO), against international agreements.[16] What is even more concerning is the CIA's apparent lack of knowledge of this outbreak. This incident occurred three years after President Nixon declared to the world that the United States would renounce the development and stockpiling of BW. The declassified documents seem to miss this outbreak completely.[17]

Unlike the smallpox incident, the CIA did not miss the release of Anthrax in Sverdlovsk (contemporary Ekaterinburg). The most alarming aspect was the apparent willingness of the CIA to believe the Soviet's explanation about the Anthrax epidemic. Officially, the Soviets claimed that a batch of contaminated meat was sold on the black market and was consumed by the population. Ken Alibek alleges that the release was due to carelessness at a BW production facility that specialized in the production of Anthrax.

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15 Domaradskij and Orent, *Biowarrior*.

16 Jonathan B. Tucker and Raymond A. Zilinskas eds., "The 1971 Smallpox Epidemic in Aralsk, Kazakhstan, and the Soviet Biological Warfare Program," *Center for Nonproliferation Studies Occasional Paper*, no. 9 (2002), 1.

17 The specific CIA documents are examined in Chapter III.

The CIA missed or dismissed these two incidents. The likely explanation of this is the tendency to "mirror-image" one's adversary. Mirror-imaging is projecting and imputing the viewer's own actions onto its adversary because it is the logical action the viewer would take in the same situation.

The United States denounced the production and stockpiling of BW years before these incidents. Owing to this denouncement, the United States was more willing to believe that the Soviets did the same on their own without making any overt statements. The anthrax incident occurred after the Soviet Union ratified the Biological and Toxin Weapons Convention, which gave the CIA added incentive to believe the innocuous excuse of tainted meat causing the infections.

3. Where Are the Scientists Now?

After the Soviet Union dissolved in 1991, a great many scientists and technicians became unemployed. These scientists were accustomed to a privileged lifestyle under the old regime and now had to fend for themselves.

Many states were looking for an edge in their military inventories, and BW is an economical and devastating means to achieve these advantages. With the Soviet collapse, these states had an ideal opportunity to recruit some of the world's leading scientists in the BW field. Both the Democratic People's Republic of Korea and Iran are suspected of trying to hire these scientists.

Close monitoring of these scientists could provide intelligence about states that are trying to procure BW. Another solution that could help stem the proliferation of BW would be to employ them gainfully in bio-technology firms working on projects to better humanity rather than eradicate it.

E. CONCLUSION

This thesis combines examines ho the United States underestimated its adversary, ignored blatant warning signs, and failed to track scientists capable of proliferating BW. This thesis may help policy makers predict which states may be seeking BW programs outside of the usual suspects. This thesis also provides information on signatures within the states suspected of producing BW agents and suggests the best way to detect a program.

Chapter II examines the early period of Soviet science, Soviet state security service, and the problem of dual-use technology.

Chapter III examines alleged accidental releases of BW agents in the Soviet Union. These incidents should have alerted the United States to the Soviet Union's BW program. Chapter III also describes attitudes in the United States regarding BW after 1969 and shows that BW did not concern U.S. intelligence as much as nuclear or conventional forces.

Chapter IV examines the problem of proliferation via the brain drain after the collapse of the Soviet Union. Immigration of scientists from suspected Soviet BW facilities to an adversarial state could indicate the possible creation of a BW program.

Chapter V concludes this thesis with recommendations and suggestions for further research. Underestimating an adversary is dangerous. This thesis shows the elements that caused the United States to miss the Soviet Union's program, and provides insights into correcting the mistakes.

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II. SOVIET BW DEVELOPMENTS FROM 1930 TO 1968

A. INTRODUCTION

Since the early 1930s of the Soviet regime, BW have played a role in the security of the state. Why did the United States completely underestimate the capabilities of the Soviet Union to develop biological weapons from the 1930s until the signing of the Biological-Toxin Weapons Convention (BTWC) in 1972? What contributed to the United States miscalculating soviet science? What role did intelligence or the lack of intelligence play? This chapter examines these issues and addresses the U.S. perceptions of the Soviet biological weapons program.

The United States was accustomed to prominent scientists publishing their works in scientific journals, yet many Soviet scientists were not allowed to publish their findings outside of Soviet Bloc publications. Even when they did publish in these periodicals, they could not discuss anything that could remotely relate to biological weapons development, including advances in routine biology. Consequently, such Soviet research was always hidden from American scientists and our intelligence community

Apart from the apparent lack of scientific research in the Soviet Union, intelligence agencies faced extreme difficulties in finding information pertaining to biological weapons. As the nature of biological weapons research is very secretive, securing such guarded data is onerous and complex. Tendencies within the U.S. intelligence agencies to project their own actions onto the Soviets may also have led to the problem of underestimating the Soviet's capabilities.

The prevalence of Lysenkoism during the formative years of the Soviet regime contributed largely to the U.S. misperceptions of this issue. Trofim Lysenko, Ivan Michurin, and colleagues disrupted Soviet science and set back Soviet research by years in several areas. These men required Soviet ideology in scholarly works, detracting from the quality of research.

Even when intelligence sources were able to locate a suspect facility, those facilities might not have been involved in biological weapons research at all. The very nature of biological weapons lends itself to easy masking within legitimate

pharmaceutical facilities. From the 1930s to the 1960s, the development of vaccines and the development of biological weapons were closely related.[18]

This chapter examines the conditions in Russia which inhibited its ability to develop modern science. Second, this chapter also examines the Soviet security services and the measures they took to protect the secret BW program. Finally, this chapter explains dual-use technology and the way it hides a BW program.

B. THE DOWNFALL OF LEGITIMATE SCIENCE IN THE SOVIET UNION

Compared to most European nations, Russia has long been known as a backward state. For example, Russia maintained the institution of serfdom long after Europe moved away from its feudal political system, and serfdom continued into the twentieth century, even though these serfs were considered and called "collective farmers." Although serfs themselves did not relate directly to Soviet science, the conditions and nature of their work, related to the problem of science in the Soviet Union. Agriculture, the main focus of the serfs, has been and remains a constant problem in the Soviet Union. The arable land outside of Ukraine is scarce and the climate is not suited to farming for most of the year. Science is needed to create crops that thrive in the harsh climate and yield greater harvests. To design these types of crops, the science of genetics is quite helpful. Genetics was the science hit hardest by the Soviet pseudo-scientists early in Soviet history. The theory of genetics explains how traits of an organism are propagated through heredity. The pseudo-scientists dismissed heredity and claimed that the environment shapes the traits of an organism.

At the forefront of the fight against legitimate science were Trofim Lysenko and Ivan Michurin. These men are described as "cranks" in modern literature as opposed to genuine scientists because they distorted the purity of science, making it a vessel for Soviet propaganda.

> The word "crank" is a pejorative, but it cannot be avoided, for cranks are quite different from scientists. Fantasy is not the distinguishing feature. Cranks may have feeble powers of imagination, while genuine scientists may indulge in extravagant flights of fancy. The essential difference is the crank's individualistic self-assurance versus the scientist's collectivistic self-doubt. The scientist looks for tests that will convince his fellows; he

[18] Domaradskij and Orent, *Biowarrior.*

> submits his fantasies to the disciplined examination of a professional community. The crank does not and usually cannot.[19]

The cranks came to the forefront of Soviet ideology in science and led to the downfall of legitimate science for decades to come. Lysenko gained notoriety with Stalin due to his experiments in Azerbaijan with winter peas and how to plant them in a rotation with cotton.[20] His "theories" about genetics flowed from these beginning experiments.

Early in the Cold War, when the United States appeared to be leading the world in space and nuclear weapons technology, Soviet biology was paralyzed. "We had gone from being one of the world's powerhouses of immunological and epidemiological research to a backwater of demoralized and discredited scientists. The cause was one man—a Russian agronomist named Trofim Lysenko."[21]

Lysenko continued his experiments on the winter peas and discovered he could grow them out of season. If the seeds of the peas were exposed to cold temperature and then planted, they would grow out of season, which is called "vernalization." From this discovery, he surmised that the environment, and not heredity, affected the growth.[22] This line of thought paralleled Stalin's opinion on how Soviet ideology should be conducted. Stalin believed that the Soviet Union could be shaped by force of will alone, and he took great steps in that direction with the forced collectivization and the Great Terror. The Great Terror focused mainly on eliminating military personnel and Stalin's political opponents. However, members of the scientific community were also singled out because they did not fall into the rank and file of the Lysenkoists.[23]

Besides Lysenko's perversion of true science, he influenced Soviet universities to require Marxist-Leninist ideology to be written into doctoral dissertations. One might imagine this was to be expected only in works relating to psychology or sociology, yet works relating to mathematics, physics, and biology (the hard sciences) were also

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[19] David Joravsky, *The Lysenko Affair* (Cambridge: Harvard University Press, 1970), 39.

[20] Zhores A. Medvedev, *The Rise and Fall of T. D. Lysenko* (New York: Columbia University Press, 1969), 11.

[21] Alibek with Handelman, *Biohazard,* 39.

[22] Medvedev, *The Rise and Fall of T.D. Lysenko,* 23.

[23] Joravsky, *The Lysenko Affair,* 113.

expected to contain references to Marxist-Leninist ideology, as though a class struggle existed even in the sciences. Igor Domaradsky, a high level scientist in the Soviet biological weapons program, comments on his experience:

> Both of my dissertations were necessarily written, therefore, under the requirements of various government decrees, which it would have been impossible to disregard when writing a dissertation. Every research paper had to contain references to party and government decrees on ideology, regardless of their (its) subject matter (Ivan Pavlov's theory, Trofim Lysenko's work, or even Stalin's work on linguistics). My candidate's thesis, for example, had to reflect the fight against cosmopolitanism or adulation of the West. The party and the government tried to isolate us, in the belief that as scientists we should be completely self-reliant. An examiner insisted that I insert a reference to "nervism" in my work on the biochemistry of one of the bacteria![24]

The influence of ideology on Soviet science was seen in the United States as negatively impacting the Soviet's ability to conduct research in many fields. In a Central Intelligence Agency report analysts noted:

> An assessment of research in genetics in the Soviet Union over the years has shown that a gradual deterioration in the quality of sanctioned pseudo-scientific theories of heredity. As a result, from 1940 until 1953, adherence to modern theories in genetic experimentation was almost entirely lacking.[25]

These assessments were not far off the mark during the period that Stalin ruled the Soviet Union; however, the CIA continued to assess the scientific programs in the Soviet Union at a degraded capability at least until 1961 when the extensive report on the Soviet BW program was released; "In some instances, past adherence to unsound theoretical principles and the apparent restriction on freedom of scientific thought and action are believed to have played a part."[26]

Initially the U.S. estimate of Soviet capabilities to develop BW was correct, but the adherence to this belief after Khrushchev came to power was woefully inaccurate.

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24 Domaradskij and Orent, *Biowarrior*, 64.

The spelling of Domaradsky with a "ky" instead of "kij" is a more Americanized version used by Ken Alibek in his book and will be used throughout this paper in the body.

25 CIA, *The Soviet BW Program*, 30.

26 Ibid, 22.

"After the depredations of Lysenkoism and the attempt to ban the study of Mendelian genetics, knowledge of modern genetics and molecular biology was at long last beginning to creep into Soviet Russia from the outside world."[27] These advances in genetics and biochemistry were to increase rapidly due to a new availability of Western scientific journals.

Scientific scholarly journals are tools that the scientific community uses to publish findings on new discoveries and techniques in all fields of research. The repressive system of the Soviet Union not only required scientists to add absurd sections about ideology, but they also severely limited publication of any discoveries. Most discoveries were deemed state secrets and locked away in the vaults of the security services related to the academic institute that made the discovery, Domaradsky wrote, "Censors could reject any publication (even scientific ones) without any explanation."[28] He also said, "Publishing in Western journals was strictly prohibited. Because of this restriction I [Domaradsky] lost many opportunities to make the scientific community aware of my work."[29] Other findings that were not deemed state secrets were allowed to be published only in journals circulated within the Soviet Bloc. These journals were rare outside of the Soviet Bloc due to restrictions on all publications no matter what their content. Even the work that was allowed to be published, after it passed the scrutiny of the censors, was subjected to even more scrutiny at the hands of the security services at Biopreparat.[30] So the intelligence agencies that ended up seeing these journals were people who might not have been fully qualified to judge the significance of the published works. Consequently, Western scientists had very little information from the Soviet Union with which to work.

Contrarily, the Soviets, while limited in the publication of their own discoveries, found Western journals quite helpful. Western journals provided the Soviets with much information that enhanced their BW program and most of their other scientific programs

27 Domaradskij and Orent, *Biowarrior*, 93.

28 Ibid, 86.

29 Ibid, 166.

30 Ibid. Biopreparat was the civilian entity set up to develop biological weapons outside of the military biological weapons program.

across the board. Several of the research institutes maintained vast libraries of Western journals for the Soviet scientists to study. Domaradsky talks about his access to scientific literature: "One benefit of council membership was that each member received $500 annually for subscriptions to scientific literature. In those days, journals and books were much cheaper than now, and I was able to subscribe to a lot of them."[31] Though the scientists enjoyed the access to these publications, elements in the government objected to Western journals. They were so consumed with Soviet ideology, as stated before, that they were unwilling to see the utility in the publications, except in certain circumstances.

> As for foreign literature, it was regarded as "nonrelevant" and was stored in a special room to which access was strictly limited. Foreign journals were considered to be nonrelevant if their titles were unconnected with any technology. This therefore ruled out all the journals on biology and medicine, even including *Nature* and *Microbiology Abstracts*.[32]

Clearly, Soviet science was able to gain useful information from Western journals, yet the Soviet ideology clashed with real science once again.

Early Soviet ideology negatively affected science in the Soviet Union, and the inability of Soviet scientists to publish in the Soviet Union also had detrimental effects. Both of these aspects of Soviet science were perceived in the West as an inability to pursue modern scientific research properly. However, these facets of Soviet science were not the only factors clouding the West's ability to detect a BW program. The Soviet security services also had a major effect on obscuring or inhibiting the U.S. intelligence collection.

C. THE BEST STATE SECURITY IN THE WORLD

Secret police organizations have had a long history in Russia. They first emerged under the rule of the tsar and then became even stronger under the Bolsheviks. The first security organization under the Bolsheviks was the Cheka led by Dzerzhinsky, and the Cheka later became the NKVD (the Soviet intelligence service) when the leadership realized that there would always be counter-revolutionary forces in the Soviet Union.[33] The NKVD expanded its powers gradually in the first few years of its creation; however,

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[31] Domaradskij and Orent, *Biowarrior,* 156-157.

[32] Ibid, 255.

[33] Graham Yost, *The KGB* (New York: Facts on File, 1989), 37.

the real expansion was led by Lavrenti Beria. Under Beria, many people disappeared to Siberia and other places unknown and were never seen again. The NKVD played a major role in the Great Terror and the purges, which hampered and degraded Soviet science. Over time, the NKVD was replaced by the KGB, which remained until the fall of the Soviet Union in 1991. After the Soviet Union collapsed, even the KGB was replaced. Its successor organization was the Federal Security Service (FSB).

Security within the Soviet Union was paramount and the state security organizations used several methods to ensure that their clandestine programs remained invisible. Physical security and censorship were two of the main methods used to prevent information leaks. Physical security had many aspects ranging from controlling the entry of foreigners into the Soviet Union to the construction of closed cities for secret research.

Restrictions on entry and exit of the Soviet Union were taken very seriously. The Soviets built many barriers to keep foreigners out of the Soviet Union, and these same barriers prevented Soviet citizens from leaving as well. The barriers closest to the border were heavily guarded, routinely set with man-traps, and patrolled by armed guards with dogs.[34] "Although the system of barriers along the borders is intended to prevent crossing of the frontier from either direction, its emphasis is clearly upon preventing unauthorised exit from the Soviet Union."[35] These barriers prevented defectors with secret information from leaving the Soviet Union and made inserting clandestine agents much more difficult. Without a reasonable number of agents inside the Soviet Union, there was a significant deficit of human intelligence (HUMINT).

Another physical security method was the limitation of electronic transmissions. Countries in the Soviet Bloc routinely jammed radio transmissions and severely limited the use of telephone services outside of the Soviet Bloc. The radio jamming was primarily aimed at blocking the British Broadcasting Company (BBC), Radio Free Europe, and the Voice of America.[36] The interruption of telephone service made it difficult for anyone inside the Soviet Union to communicate with family, friends, or

[34] Raymond Hutchings, *Soviet Secrecy and Non-secrecy* (New Jersey: Barnes & Noble Books, 1988), 94.

[35] Ibid, 95.

[36] Hutchings, *Soviet Secrecy and Non-secrecy*, 98.

colleagues in the outside world. Those communications that did go through were monitored and a sustained connection could not be guaranteed. Getting information out of the Soviet Bloc was again made extremely difficult.

Within the Soviet Union there were even restrictions on citizens living in the major cities. "Residence in principal cities, including Moscow, Leningrad and Kiev, is permitted only with authorisation; this would normally go with a particular job."[37] These restrictions on living in the major cities were additional barriers to inserting agents to spy on Soviet programs. Even travel to the cities for a visit had to be approved in advance by the government and marked on the internal passport that every Soviet citizen over the age of sixteen was required to carry.[38] Restrictions on the ability to live in the major cities in the Soviet Union was just one more method that restricted the ability of agents to infiltrate secret programs or even to set up a safe house for informers. The only spies that could operate in these cities were the official cover agents working for the embassies. Of course, these agents were well known to the KGB and were regularly tracked: "Foreigners within the Soviet Union, whether diplomats or not, are liable to be followed."[39] The constant observation of these agents made it difficult to obtain Soviet state secrets.

The main cities in the Soviet Union were off limits to people without permits to live there, but at least these cities were on the map. Other cities were off limits to unauthorized people, and they did not appear on any public maps. These were the closed cities. In closed cities, much of the Soviet's secret research was conducted. "The foundation of 'scientific' towns was doubtlessly decided upon partly in order to preserve confidentiality within information fortresses, as well as for ideological reasons–more unorthodox ideas may circulate here than is allowed in a normal community."[40] Many of

[37] Hutchings, *Soviet Secrecy and Non-secrecy*, 100. The spelling of principal versus principle and authorisation versus authorization are taken directly from the text.

[38] Ibid, 101.

[39] Ibid, 106.

[40] Ibid, 101.

these cities were in close proximity to Moscow, but several were scattered around the wilderness of the Soviet Union. Obolensk was one of these closed cities where Igor Domaradsky did much of his research.

In a closed city such as Obolensk everything depended on people like him. It is difficult to explain to those in the West what life in such a closed town was really like, and how dependent its inhabitants and workers were on such leaders. There were police stations on the two roads to the institute adjacent to the town. Nobody could live in Obolensk without special permission. The town and its institute were carved right out of the wilderness. Again, they could not even be found on a map.[41]

Much of the Soviet nuclear and biological weapons research was conducted in closed cities such as Obolensk. These closed cities provided one more shroud of secrecy for intelligence agencies to penetrate and proved crucial in preventing these programs from being closely scrutinized. In the CIA's report on the Soviet BW program, these cities appear to be highly effective.

> There is insufficient direct evidence on which to base a firm assessment of Soviet BW offensive activities. No BW production facilities have been identified in the USSR, but known biological facilities are adequate to produce bacterial BW agents if desired.[42]

The fact that the CIA was unable to discern the existence of an offensive program shows how effective the closed cities were.

The limitations on access to Moscow and the prohibition on access to closed cities were not the only methods used to keep information secure. Security services also restricted contact between Soviet citizens and foreigners, but they especially reduced the contact between Soviet scientists and their foreign colleagues. "If named Soviet scientists are invited to a foreign congress, the reply is liable to be delayed and that invitee replaced by someone else."[43] Igor Domaradsky routinely had to decline invitations to scientific conferences and symposiums that could have aided Soviet research: "These restrictions on trips abroad caused me endless vexation, not to mention

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41 Domaradskij and Orent, *Biowarrior,* 233.

42 CIA, *The Soviet BW Program,* iii.

43 Hutchings, *Soviet Secrecy and Non-secrecy,* 102.

embarrassment, when I had to think up some reason for turning down pressing and very tempting invitations from my foreign colleagues."[44] Many times Domaradsky had to decline these offers at the last minute. Domaradsky's travel restriction kept him from being tempted to divulge state secrets, as other defectors would later do, and it also kept him away from Western influences.

Security in the Soviet Union as a whole was strict, but security within the laboratories working on BW was even more stringent. Biopreparat was deemed important enough to have its own KGB counter-intelligence chief.[45] These security men even made sure that the journals mentioned in the previous section were held only by the institutes and not the scientists. "The secret service considered that the mere presence of literature on genetics and bacteriology could disclose the real purpose of our work."[46] Apparently these techniques were quite effective: "So far, insufficient evidence is at hand to connect either the MVD or KGB with offensive BW research, testing, or employment, and information on this association is exceedingly scarce."[47]

Though the security services were quite good at secreting away the BW program, the United States made a crucial mistake that still plagues the intelligence agencies today, mirror imaging. "One of the most frequent flaws of analysts is mirror imaging, which assumes that other leaders, states, and groups share motivations or goals similar to those most familiar to the analyst."[48] Because the United States did not undertake extensive BW research and production, U.S. intelligence agencies believed that the Soviet Union was doing likewise. The Soviet Union also accepted the mirror imaging concept, except they thought the United States had a massive BW program. Ken Alibek recalls a conversation with a KGB officer:

> According to that treaty no one is allowed to make biological weapons. But the United States signed it too, and we believe that the Americans are

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[44] Domaradskij and Orent, *Biowarrior* 153.

[45] Alibek with Handelman, *Biohazard,* 100.

[46] Domaradskij and Orent, *Biowarrior,* 255.

[47] CIA, *The Soviet BW Program,* 17.

[48] Mark M. Lowenthal, *Intelligence from Secrets to Policy* (Washington, D.C.: CQ Press, 2006), 118.

> lying…. It was not difficult for me to believe that the United States would use any conceivable weapon against us, and that our own survival depended on matching their duplicity.[49]

Mirror imaging can work both ways. It can lead one side to believe that nothing is occurring, and it can lead the other side to believe that the adversary is stockpiling massive amounts of weapons or are engaged in other provocative acts.

D. DUAL-USE TECHNOLOGY AND MASKIROVKA

The Soviet Union was a master at hiding its programs, not only in the closed cities, but in plain sight. The Anti-Plague Institutes did valuable research on combating the plague, but they also played a large role in the development of plague as a biological weapon. The cover of the Anti-Plague Institutes adequately fooled U.S. intelligence.

> Although the Soviet Union is actively studying almost every disease of worldwide interest and importance, the direction of emphasis lies in developing and applying more effective biological counter-measures such as vaccines, protective antisera and antibiotics; devising better diagnostic and disinfection procedures; compiling epidemiological information; and determining the means for combating arthropod and rodent carriers of disease.[50]

The use of the Anti-Plague Institutes illustrates how easily a biological research facility can turn from research on combating disease to producing lethal weapons. The process of manufacturing a vaccine or a biological weapon share many of the same steps. A biological weapon only requires a few more steps to create than a vaccine. Therefore, the same facilities that create vaccines can be rapidly converted into a weapons production facility. Again the CIA underestimated the capability of the Soviet program: "Thus, while conversion of antibiotic producing facilities to BW agent production is possible, the probability of such conversion is considered extremely unlikely."[51] The CIA also assessed the Soviet fermentation industry, "The fermentation industry of the Soviet Union lags considerably behind that of the West in almost every respect; in some

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[49] Alibek with Handelman, *Biohazard*, 53.

[50] CIA, *The Soviet BW Program*, 24.

[51] Ibid, 39.

phases of industrial fermentation this lag has been estimated to be some 10 to 15 years in terms of time."[52] The actual ability of the Soviets to ferment would soon be more productive than that of the US.

The dual use of facilities was not the only way that the Soviets used Maskirovka, or camouflage, to disguise facilities. They went to great lengths to divert suspicion away from new constructions that could be photographed by the U-2 or spy satellites. In the early 1960s, the United States launched its first spy satellites, the discovery series of satellites that used wet film and ejected the canisters back into the atmosphere for recovery. The Soviets knew about these satellites and disguised the Obolensk facility where Domaradsky worked. "In order to mislead any foreign satellite intelligence, the Institute of Applied Microbiology was deliberately built to look like some kind of sanatorium, with the convalescents walking about in pajamas or playing volleyball!"[53]

E. CONCLUSION

The United States underestimated the Soviet's ability to develop and produce BW prior to the signing of the Biological and Toxin Weapons Convention (BTWC) in the early 1970s. The early analysis of the Soviet's capability to conduct research was correct. Lysenko had a detrimental impact on Soviet science and his ideas led to a thinning of legitimate scientists. The United States interpreted Lysenko's effect on Soviet science correctly in the early years, but the United States failed to see that some of the scientists could conduct their research with some protection. The United States also failed to realize that the lack of scientific publication by Soviet scientists did not mean they were behind. The Soviets just considered all their scientific discoveries state secrets and simply would not allow their publication. Besides the apparent lack of scientific achievement, barriers were implemented by the security organizations in the Soviet Union. The restrictions on travel, places to live, and censorship significantly increased the difficulty of U.S. intelligence to discover the existence of the programs. The closed cities where much of the secret research was conducted also provided a significant barrier to U.S. intelligence.

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[52] CIA, *The Soviet BW Program*, 38.

[53] Domaradskij and Orent, *Biowarrior*, 185.

In addition to the policy and security, the nature of biological research lends itself to concealment because of the dual-use nature of the work. Shortfalls in intelligence gathering and tendencies within intelligence agencies to mirror-image left the United States blind to the Soviet's programs. By bringing these past shortfalls to light in the context of a BW program, hopefully intelligence analysts will be able to see their past mistakes and learn from them. The techniques used by the Soviet Union to hide its program are techniques that many potential adversaries could use today. When our mistakes are understood, we are one step closer to not repeating them.

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III. BLINDERS ON SMALLPOX AND ANTHRAX

A. INTRODUCTION

In 1969, President Nixon declared that the United States would place a moratorium on all offensive BW research and production.

> I have decided that the United States of America will renounce the use of any form of deadly biological weapons that either kill or incapacitate. Our bacteriological programs in the future will be confined to research in biological defense, on techniques of immunization, and on measures of controlling and preventing the spread of disease.[54]

Prior to his statement, the United States was developing BW for the main purpose of incapacitation in the event that BW were used against the United States. Though the United States had an active BW program, it was not very extensive, especially when compared to the Soviet program. The United States did not see BW as a particularly valuable strategic or tactical weapon because of its inherent unpredictability.[55] The Soviet Union did not reciprocate and continued to improve its BW capabilities and stockpiles.[56]

The Soviet's continuing BW program made dramatic gains in its capabilities, ranging from increasing virulence the ability to transmit the BW to enhancing delivery systems.[57] A crash program to increase a military's capabilities with deadly substances like BW is likely to suffer some setbacks in any nation. The Soviets were no exception. Two major accidents with BW agents led to the deaths of Soviet citizens not involved in the BW program. The deaths range from sixty to several hundred and these incidents occurred in the 1970s near areas that either produced or tested BW. Due to the severity of these accidents, it was remarkable that U.S. intelligence either missed the incident or accepted the Soviet explanations.

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[54] Federation of American Scientists (FAS), "462 Remarks Announcing Decisions on Chemical and Biological Defense Policies and Programs," November 25, 1969, http://www.fas.org/bwc/nixon_bw_renounce.pdf (accessed August 25, 2006).

[55] Wheelis, Rozsa, and Dando, *Deadly Cultures*, 9-46.

[56] Alibek with Handelman, *Biohazard.*

[57] Ibid.

U.S. intelligence agencies accepted the Soviet explanations and even missed an outbreak of smallpox in the Soviet Union owing to the exceptional security services within the Soviet Union, the Soviet's blatant disregard for international agreements, and U.S. intelligence believing what they wanted to believe.

Two major accidents within the Soviet Union were an outbreak of smallpox in Aralsk, Kazakhstan, and an outbreak of Anthrax in the city of Sverdlovsk. At the time of these incidents, a natural outbreak of both diseases would have been possible, but highly unlikely, especially in the case of the Anthrax outbreak.

This chapter explains the U.S. position on BW after 1969. The United States renounced the offensive research of BW under President Nixon. Second, this chapter examines an outbreak of smallpox in Kazakhstan in 1971. This outbreak occurred in an area adjacent to the main Soviet BW proving grounds. Third, this chapter examines the outbreak of anthrax in Sverdlovsk. In 1979 pulmonary anthrax infected and killed scores of people. The Soviets denied any correlation to its military research facility nearby. Finally, this chapter illustrates the lack of emphasis the United States placed on the Soviet BW threat.

B. THE U.S. POSITION ON BW AFTER 1969

After President Nixon's announcement, the U.S. BW research facilities were either shut down or scaled back to defense research. The Pine Bluff Arsenal in Arkansas had been the primary facility in the United States for chemical weapons research, production and storage. In the 1950s, this facility also began to conduct research into BW. Due to President Nixon's statement, the Pine Bluff Arsenal was eliminated from the U.S. facilities as a place to research and produce BW. Ken Alibek, as a representative of the Soviet government, verified that the Pine Bluff Arsenal was decommissioned on his official tour of the facility. He noted that the former labs had been abandoned and that years of dust covered the desks, floors, and even an old notebook last dated over twenty years before the visit.[58] Camp Detrick was another facility dedicated to the research and production of BW. This facility is currently the home of the United States Army Medical Research Institute of Infectious Diseases (USAMRIID). It was decommissioned as an offensive facility and conducts prophylactic research on infectious disease. When it was

[58]Alibek with Handelman, *Biohazard*, 237.

made a defensive facility, President Nixon transferred much of Camp Detrick's facilities to the National Cancer Institute to aid research in finding a cure for cancer.[59]

Why did the United States renounce the use of BW? At the end of World War I, the United States agreed in principle to the Geneva Protocols, which would have prevented any BW development. However, the United States failed to ratify the agreement until 1975 and did not cease offensive research and production of BW until President Nixon was in office. On the other hand, Russia did ratify the Geneva Protocols in 1928, but it did not uphold the agreement's legally binding obligation. This non-compliance by the Russians would prove to be a recurring pattern of behavior. Nixon's policies toward BW preempted the inception of the Biological and Toxin Weapons Convention (BTWC). President Nixon understood and stated that BW agents could have "massive, unpredictable, and potentially uncontrollable consequences. It may produce global epidemics and profoundly affect the health of future generations."[60]

Ultimately, the President's decision led the way to a strictly defensive BW program in the United States. Several years after the renunciation of BW, the United States signed and ratified the BTWC. In effect, the United States had already complied with Article II of the BTWC convention that states:

> Each State Party to this Convention undertakes to destroy, or to divert to peaceful purposes, as soon as possible but not later than nine months after entry into force of the Convention, all agents, toxins, weapons, equipment and means of delivery specified in Article I of the Convention, which are in its possession or under its jurisdiction or control. In implementing the provisions of this article all necessary safety precautions shall be observed to protect populations and the environment.[61]

Ironically, the Soviet Union also signed and ratified the BTWC, which took effect in 1975. Unlike the Soviet Union, the United States honored its commitments of BTWC and disarmed.

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[59] Alibek with Handelman, *Biohazard*, 234.

[60] FAS, "462 Remarks Announcing Decisions on Chemical and Biological Defense Policies and Programs."

[61] The Biological and Toxin Weapons Convention Website, "The Biological and Toxin Weapons Convention," April 10, 1972, http://www.opbw.org/convention/documents/btwctext.pdf (accessed August 25, 2006).

Unfortunately the BTWC contains no binding mechanisms to enforce the treaty. No verification process exists, which, naturally, is necessary to determine if each side is complying with the treaty. In the 1990s, the first steps toward verification of BW disarmament was initiated bilaterally by the United States and the Soviet Union. Both countries agreed to inspections at facilities specified by the visiting countries. When the Soviets hosted U.S. experts on BW, their hosting events were completely duplicitous. Many areas were off limits to the U.S. representatives, and their every move was constantly monitored while on Soviet soil.[62] Instead of allaying their misgivings, the Soviet actions aroused the suspicions of the U.S. inspectors.

In stark contrast, the Soviet visit to the United States was completely open. The Soviet inspectors were given access to all areas of the facilities that they requested to visit. Some of the Soviet antics on this visit showed the depth of their paranoia. Colonel Vasiliev, the leader of the inspection team, instructed the bus to halt after finding a "suspicious" building on the map that U.S. representatives gave them. Vasiliev asked his hosts what the building was, and they told him it was nothing to worry about. Thinking they had caught the Americans in a dubious act, they directed the bus to this small building and entered. Inside they found a mound of white crystals. Again they asked the Americans to explain. The U.S. representatives told them it was salt for de-icing the roads in winter and then proved it by sticking their fingers in the mound and tasting the substance.[63] Similar incidents occurred on each facility visit, and each time the Soviets were embarrassed when they found absolutely nothing incriminating. Even when they were instructed by Moscow to find inculpating evidence at all costs, the Soviets were shown that the United States had completely abandoned its program.

C. ARALSK, KAZAKHSTAN

1. Brief History of Smallpox

Smallpox, one of the most deadly viruses that specifically targets human beings, occurred in nature and had devastating effects on populations throughout the history of the world. This disease causes lesions that cover the entire body and the respiratory pathways. Each of these lesions is filled with millions of the virus. Because the

62 Alibek with Handelman, *Biohazard*, 193-207.

63 Ibid, 229.

respiratory system consists of soft tissue, the lesions in this area are likely to break. When they break, the virus is exhaled. These viruses remain viable in the air and easily infect other people.[64] The scabs of the lesions that form on the body also contain the virus and the disease can be spread by physical contact with the scabs, the patient, or the area they occupied. Smallpox is highly contagious and can infect a large population very quickly. The lethality of the disease is quite high. The more lesions an infected person has on his or her skin, the more likely the person will die from the disease. Those that do survive the disease are often left scarred for life due to the lesions and many are blinded. Several accounts describe the use of smallpox as a BW in the seventeenth and eighteenth centuries. American Indians were given blankets for the harsh winters that had once been used by smallpox infected settlers. These blankets were intended to infect the American Indians with smallpox and weaken their population.[65]

The World Health Organization (WHO) dedicated its resources in 1967 to eradicating smallpox due to the many deaths it caused. Because smallpox only exists in human populations, it is a perfect candidate for eradication. It does not exist in nature outside of humans, as many other infectious diseases, such as bubonic plague and anthrax. The WHO declared smallpox eradicated in 1980 after a massive effort to immunize much of the world's population against the disease, and the last documented case of smallpox was in Somalia in 1977.

Why is smallpox such a valuable weapon? It is a valuable weapon because it has been eradicated by the WHO. There are only two authorized repositories of smallpox, one in Russia and one in the United States; both samples are held for research purposes only. When the WHO was in the process of eradicating the virus, the smallpox vaccine was required for its research. Since the eradication, people have not been immunized to the virus, making it an extremely potent weapon.

2. Vozrozhdeniya Island

Vozrozhdeniya Island, better known in English as Rebirth Island, was located in the Aral Sea. Today it is more like the Rebirth Peninsula because much of the Aral Sea

[64] I. W. Fong and Kenneth Alibek eds., *Bioterrorism and Infectious Agents: A New Dilemma for the 21st Century* (USA: Springer, 2005), 150.

[65] Robert Harris and Jeremy Paxman, *A Higher Form of Killing* (New York: Random House, 2002), 76.

has disappeared. Rebirth Island was an island located approximately fifty miles from shore during the height of the Soviet BW testing. The island's location in the middle of Kazakhstan far away from prying Western eyes made it a perfect location for testing BW. This site was suspected by the CIA: "Perhaps the most notable progress was made in the collection of vital information on Vozrozhdeniya Island, long considered because of its ideal location to be the most probable site of Soviet field-test activities."[66] The next sentence in the declassified document is blacked out, which could indicate that the CIA had more information about the site, but most references in the report are speculative at best. According to Ken Alibek, Rebirth Island was the preferred site for open air BW testing and was so secret that the scientists were not allowed to tell their families where they were going when tests were being conducted.[67]

3. Tests and Consequences

Open air testing of BW agents on Rebirth Island is alleged to have increased the occurrences of diseases in the local area. The two major instances were an outbreak of smallpox in 1971 and an outbreak of plague in 1990. The outbreak of smallpox is alarming because the Soviet Union supposedly eradicated the disease in 1936.[68] The Soviets did not notify the WHO of the smallpox epidemic, as required by international agreements. Why would the Soviets blatantly ignore this agreement to report an outbreak of smallpox? Two reasons could explain this Soviet behavior. The first explanation is the Soviet mindset of keeping everything, no matter significant or insignificant, secret from its citizens and from the world. The second explanation is that they were testing a smallpox BW on Rebirth Island and inadvertently infected locals who wandered into the agent dispersal area while fishing on the Aral Sea. Jonathon Tucker and Raymond Zilinskas allege the second explanation as the reason for the outbreak. This is the more likely explanation, considering the scope of the Soviet BW program and information provided by Ken Alibek about open-air testing of BW agents on the island.[69]

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66 CIA, *The Soviet BW Program,* 8.

67 Alibek with Handelman, *Biohazard,* 16.

68 Tucker and Zilinskas, "The 1971 Smallpox Epidemic in Aralsk, Kazakhstan, and the Soviet Biological Warfare Program," 1.

69 Ibid.

Even more distressing is the lack of declassified U.S. government documents regarding this incident. Considering the amount of other declassified documents concerning Soviet BW activities, this would suggest that the United States completely missed this outbreak altogether. If U.S. intelligence knew about the epidemic, the information was collected in such a manner that it is not releasable yet. The explanation for it not being declassified is doubtful. Most of the declassified material is marked SECRET NOFORN. The "secret" designation means the release of this information could seriously damage the national security of the United States, and the NOFORN marking means it is not releasable to any foreign countries including the closest allies of the United States. The documents marked secret are the older sources available from the CIA. One of the newly declassified documents was marked TOP SECRET, which means the release of the information could be expected to cause exceptionally grave damage to the national security of the United States if released without authorization. The declassified top-secret document was dated 1990 and the smallpox epidemic occurred in 1971. The usual time frame for declassification is twenty-five years, which has clearly passed for the smallpox epidemic. The time involved between the smallpox outbreak and the lack of declassified materials suggest that there was no unusual method of intelligence collection, and that U.S. intelligence missed the event.

In September 1990, reports of an outbreak of plague in Aralsk surfaced. Was this an accident related to a BW aerosol test or a natural occurrence? Considering past Soviet behavior when an outbreak related to BW activities occurred, their behavior in this instance suggested it was most likely a natural occurrence. A Moscow newspaper reported the incident:

> As an outbreak of plague has been registered in the town of Aralsk in Kazakhstan. One of two people affected has already died, [and] 340 people who were in contact with them have been hospitalized. Aralsk has been placed under quarantine, medical posts set up, and offices closed.[70]

Reporting an incident concerning a BW aerosol test accident by Soviet press sources is extremely unlikely given their history of reporting only what the Communist Party authorizes. The CIA assessment of the outbreak is inconclusive:

[70] CIA, *Possible BW Accident in USSR?*, CIA Electronic Reading Room (21 September 1990), CIA-FOIA, 3.

> We do not know if this incident represents a BW accident or is a natural occurrence. If it is an accident, we do not know if it resulted from a test or from an attempted clean-up of the test site. Although it is theoretically possible that consumption of tainted meat could lead to contracting plague, the Soviet medical response is surprisingly large and rapid for a natural outbreak.[71]

The cause of this outbreak is probably a combination of both explanations. Rebirth Island was not just a test site for smallpox, but also for tularemia, plague, and other BW agents. The outbreak was likely "natural" because people were not exposed directly to a BW test. Also, some strain of plague tested on Rebirth Island infected the local vermin population where it could lay dormant for years. Today Rebirth Island is no longer an island separated from the mainland, so it would be easy for vermin to contact the human population. The rapid response of Soviet medical staff is surprising, but given the close proximity of Aralsk to Rebirth Island it would have been prudent for the Soviets to have trained medical staff nearby to monitor the population for possible leaks from tests years before.

D. SVERDLOVSK, U.S.S.R.

1. The Incident

The city of Sverdlovsk was one of the closed cities during the height of the Cold War. It was known mainly for its nuclear research facilities, but it garnered world attention in 1979 when an outbreak of anthrax occurred in the city. The scope of deaths resulting from the anthrax is unclear. The numbers range from a low estimation of 66 fatalities to an estimate of several hundred.

Sverdlovsk was home to one of the Soviet Union's anthrax producing facilities. The most well known non-Soviet account of the event implies that a small amount of weaponized anthrax spores escaped from the BW facility when a technician was unable to change an air filter on one of the anthrax refining machines. The technician at fault left a note for the next shift to change the filter before starting the machine. The oncoming shift noticed the machine was shut off but failed to notice the note regarding

[71] CIA, *Possible BW Accident in USSR?*, 2.

the filter so they turned the machine on. The machine then pumped the anthrax spores into the air and contaminated an area of the city adjacent to the BW facility.[72]

Shortly after the release of the anthrax into the city, people began dying. The news of the deaths in Sverdlovsk reached the West, while the Soviets were able to muffle the incident at home:

> In 1979 the Soviet government had managed to keep the epidemic quiet: almost no one in the country, apart from military doctors and civil medical staff in Sverdlovsk itself, knew anything about it. This was the general practice: the government always tried to keep news of any outbreak from its own people. But, ironically, the rest of the world learned about the outbreak rapidly: reports leaked within a few days to the outside world.[73]

To the Soviets, a cover-up of this size would seem insignificant compared to keeping the starvation of Ukrainians secret from the country during the time of Stalin's terror. Even though word of the Soviet anthrax accident leaked to the outside world, little was ever done about it.

In an interview with a childhood resident of Sverdlovsk, the secrecy of the issue was apparent. [74] When asked about the anthrax, she had no idea of the incident. Then when the year was mentioned, she could recall that her childhood friend had a small dog that died suddenly and without a directly evident external cause during the anthrax outbreak. She would not have remembered the death of one dog, but recalled that many of her other classmates had dogs that died in a similar fashion all within a short amount of time. She could also recount that the adults would gossip in the kitchens about people possibly dying from an illness, but there was never any official word from government officials in the city. Her account of the dogs corroborates Alibek's description of the government rounding up dogs during this period.[75] At the end of the interview, she was asked what she thought had caused the epidemic. Her responses supported the Soviet government's line of tainted meat, but became highly skeptical when a BW release was mentioned.

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[72] Alibek with Handelman, *Biohazard*, 70-86.

[73] Domaradskij and Orent, *Biowarrior*, 224.

[74] Interview with former citizen of the city of Sverdlovsk, July 14, 2006 by the author of this thesis. The interviewee wishes to remain anonymous and her name is withheld by mutual agreement.

[75] Alibek with Handelman, *Biohazard*, 75.

2. Soviet Explanations

Soviet explanations of the anthrax epidemic cite the consumption of tainted meat as its cause. They have maintained the following official explanation:

> Soviet officials fell back on the claim that the disease was caused by contaminated meat. Doctors displayed photos that suggested victims had contracted intestinal anthrax, by far the rarest form of the disease (it accounts for fewer than one percent of all cases). But officials could not hide the presence of pulmonary or inhalational anthrax, the most lethal of all.[76]

In 1992 the Yeltsin government allowed a researcher from Harvard, Matthew Meselson, to visit Sverdlovsk and do an independent investigation into the incident.[77] Meselson's investigation pointed to cases of pulmonary anthrax and did not support the Soviet account of spoiled meat. The Russian Ministry of Defense still claims that the incident was caused by tainted meat and that Meselson's findings are in error.[78]

3. A View from the United States

The United States seems to have placed very little importance on BW in the past. When the United States was confronted with direct evidence of a BW program, it still failed to place the proper attention on the situation. The United States did request explanations from the Soviet government about the incident in Sverdlovsk, but little outrage was evident in the international community when an alleged violation of a treaty occurred. There are two likely explanations. The first explanation is that the United States did not believe at the time that the Soviet Union was producing BW agents on a large scale. The second explanation is that the United States did not want to risk political capital in the international community by bringing unfounded charges to the United Nations.

Declassified reports over the years mention a Soviet BW program, but do not give it the proper attention it deserves. The following statements come from national intelligence estimates presented by the CIA:

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[76] Alibek with Handelman, *Biohazard,* 77.

[77] Domaradskij and Orent, *Biowarrior,* 224.

[78] Matthew Meselson et al., "The Sverdlovsk Anthrax Outbreak of 1979," *Science*, n.s., 266, no. 5188 (November. 18, 1994): 1202-1208.

> 1. The Soviets are conducting research and development programs on the possible military applications of biological agents. In previous years, virtually all available evidence could be related to Soviet work in epidemiology, public health, and sanitation, and defensive aspects of biological warfare (BW), but recent evidence points to the development of BW weapons.[79]
>
> 2. We [the CIA] believe it highly unlikely that the Soviets would employ BW in an initial strategic attack, although it might subsequently be used in the course of a general war.[80]
>
> 3. There is good evidence that, in the past, the Soviets conducted extensive research on biological agents and protective techniques, and they probably have facilities that could be used to make biological agents.[81]
>
> 4. All Warsaw Pact countries have signed the Biological Warfare Convention prohibiting the production, storage, and use of biological weapons. There is no evidence that any of them have violated the treaty. The Convention permits defensively oriented BW programs, which the Soviets are know to have. [text obscured] available evidence does not treat offensive use of biological weapons. We assume, however, that the Soviets are continuing research on biological agents, and that they have facilities which could be used to produce biological weapons if a decision were made to do so.[82]

The third point is repeated verbatim in a 1976 national intelligence estimate. Other estimates were unavailable for review, but considering the consistent nature of the estimates from 1969 to 1979, that they were significantly different, is unlikely. In each of these estimates many pages are dedicated to the nuclear forces of the Soviet Union, but BW garner little attention in these reports. Clearly, BW were not of high importance to the intelligence community. Unfortunately, the assessment that the Soviets were not employing BW in a strategic attack was incorrect. Ken Alibek alleges that there were plans to outfit SS-18 heavy lift missiles with BW payloads to target the United States.[83]

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79 CIA, *National Intelligence Estimate 11-11-69 Soviet Chemical and Biological Warfare Capabilities,* CIA Electronic Reading Room (13 February 1969), CIA-FOIA, 9.

80 Ibid.

81 CIA, *National Intelligence Estimate 11-14-75 Warsaw Pact Forces Opposite NATO,* CIA Electronic Reading Room (04 September 1975), CIA-FOIA, 24.

82 CIA, *National Intelligence Estimate 11-14-79, Warsaw Pact Forces Opposite NATO,* CIA Electronic Reading Room (01 January 1979), CIA-FOIA, 24.

83 Alibek with Handelman, *Biohazard,* 5.

In a short CIA report on the anthrax epidemic, the findings were inconclusive. Considering the 1979 national intelligence estimate, this was par for the course. The report states: "The allegation that numerous deaths resulted from an accident at an unnamed BW institute in Sverdlovsk remains speculation and is only one possible explanation for these rumors."[84] This same report treats the anthrax epidemic as something spread by word of mouth and undermines its credence. "Despite the proliferation of the rumors of a BW-related accident, there is insufficient evidence that the alleged deaths can be attributed to unlawful storage of a BW agent."[85] The information in this report was apparently submitted by a Russian émigré who heard the news from friends. In 1980 a one-page report was issued that strengthened the possibility of the epidemic as a BW related incident, yet again, the alert failed to have any urgency: "Recent intelligence strengthens allegations that an accident at a BW installation caused civilian casualties in southern Sverdlovsk during April 1979."[86] In 1986 the Defense Intelligence Agency published a short booklet on Soviet BW capabilities. This described the anthrax outbreak in Sverdlovsk in greater detail. It took seven years for them to publish (it) and they still only have suspicions, yet there was no outcry. They were only "increasingly concerned."[87]

E. CONCLUSION

The existence of a Soviet BW program is incontrovertible. There are multiple sources from within the establishment of the Soviet BW program that have exposed the threat to the West. These people include both defectors and citizens who remain in Russia. Though some distracters may argue that the people who stepped forward to expose this potentially devastating threat are cranks or have scores to settle with their homeland, arguing with a former head of state is difficult. In 1992 Boris Yeltsin, the President of Russia, admitted that an offensive BW program existed and that Russia would renounce the ways of the Soviet past and convert the facilities to civilian use.[88]

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[84] CIA, *Biological Warfare USSR: Additional Rumors of an Accident at the Biological Warfare Institute in Sverdlovsk,* CIA Electronic Reading Room (15 October 1979), CIA-FOIA, 1.

[85] Ibid., 2.

[86] CIA, *USSR: Biological Warfare (BW) Accident in Sverdlovsk,* CIA Electronic Reading Room (28 January 1980), CIA-FOIA, 1.

[87] Defense Intelligence Agency (DIA), *Soviet Biological Warfare Threat* (1986), DIA, iii.

[88] Wendy Barnaby, *The Plague Makers,* 105.

Seemingly, it only took the Russians twenty-two years to follow the U.S. example. Though Yeltsin, and later Putin, claimed that the BW program was halted, there is no evidence that it actually was. On the other hand, there is no evidence that it did not.

The renunciation of the BW program by the United States put blinders on the U.S. intelligence community and adversely affected the Soviet perspective of the U.S. BW program. The views of each country toward the other's BW program facilitated its actions with regard to its own programs. When the United States made its statement to disarm and then legally bound itself in the endeavor by ratifying both the Geneva Protocols and the BTWC, it thought that its adversaries would do likewise. The Soviet Union also saw in its adversary exactly what it would have done. If the Soviet Union had made a declaration to disarm, it would have only hidden its programs deeper within its already secret networks. This is exactly what happened with the Soviets, except they made no statement. Biopreparat was formed to shield the Ministry of Defense from unwanted attention in the area of BW.

The accidental release of BW agents by Soviet testing sites and production facilities should have raised a red flag for the United States. The smallpox epidemic in Aralsk seemingly went undetected by U.S. intelligence and the anthrax epidemic was not given the proper attention it deserved. It is obvious that the United States placed little importance on the threat of BW and instead focused mainly on the issue of nuclear and conventional weapons. All of the national intelligence estimates dedicate pages and pages of information to analyzing the Soviets' capabilities regarding nuclear and conventional forces, yet the statements on BW remained relatively the same and continued to be sparse. Even when the statements changed, they were only given a couple of paragraphs that are easily missed if one just skims the document.

The leak of information when the anthrax epidemic occurred in 1979 should have galvanized the United States into taking more action. It is clear that it did not because the defectors Pasechnik and Alibek shocked their debriefers when they explained the full scope of the Soviet program a full ten years after the anthrax release. The United States must actively ferret out BW programs in potentially problematic states. These weapons have the ability to kill millions of people and be undetectable until the first cases appear.

Obviously, current U.S. policy focuses mainly on nuclear issues. The United States constantly decries the nuclear programs of both Iran and North Korea, yet does little research on BW. If history is a model upon which future behavior can be patterned, then the United States either has not placed sufficient emphasis on the issue of BW, or it has missed programs in these countries as well. The United States must address these matters rigorously.

IV. BRAIN DRAIN IN THE BW FIELD

A. INTRODUCTION

In recent years, weapons of mass destruction have dictated the current policies of the United States. These policies have taken this country to war in Iraq, and a black cloud looms on the horizon with respect to Iran and the nuclear program they are allegedly pursuing. Although these countries are not completely backward in every sense, they do not currently have the capability to indigenously produce weapons of mass destruction but have plenty of money to fund programs. Russia, on the other hand, has plenty of scientific and technical knowledge to produce these systems, but the economic situation in Russia limits them from pursuing new scientific programs whether they are related to weapons of mass destruction or benevolent intentions. When the Soviet Union was in control, there was always plenty of money and status for the scientists involved in their weapons programs. Now these same scientists can barely support their families. This dire economic situation for Russian scientists must concern non-proliferation regimes. This chapter examines how the intelligence community can contribute to the prevention of human resources from leaving Russia for BW programs abroad or how to detect them once they have left their former jobs.

B. THE ECONOMIC IMPACT OF THE SOVIET COLLAPSE

During the height of the Cold War, budgets for weapons programs were huge. There were plenty of scientists with expertise in the biological weapons field in the Soviet Union and also plenty of money to support the projects. The assistant director of *Biopreparat*, the civilian branch of Soviet biological weapons development program, Ken Alibek describes his budget:

> Money was never a problem. As late as 1990, when Soviet leader Mikhail Gorbachev was promising the world major cutbacks in our arsenals, I was authorized to spend the equivalent of $200 million, including $70 million for new buildings. The total figure spent that year on biological weapons development was close to a billion dollars.[89]

[89] Alibek and Handelman, *Biohazard*, 43.

Alibek also described receiving a substantial salary, but the real prize was the perks and influence he received as a senior researcher and bureaucrat.[90] After the collapse of the Soviet Union, the economic situation for everyone changed, especially after the collapse of the economy in 1998. The economic collapse left many Russians with little to no savings, and jobs started to pay less and less if they paid anything at all. The Russian government no longer had the funds to pay the military or government employees. "Salaries for senior scientists had declined to less than $50 per month, and all of the foregoing proliferation concerns were at the center of international concern."[91] With salaries dipping that low and the equipment and facilities degrading, any scientist would be hard pressed to remain in such dismal conditions. To try to stem the flow of weaponeers leaving Russia, short term fixes were implemented.

> Thus, work by former weaponeers on civilian projects supported by the United States and other western governments was based on one- and two-year projects. Russian specialists would draw steady salaries for a short time, while also contributing either to international science or more directly to Russian economic development. *Keep them busy* so they will not have time to look to rogue states for support; this was the doctrine. Cynics described these efforts as a form of bribery of scientists that could not be maintained long term.[92]

Unfortunately, the cynics were right about the economic prospects and the projects could not be maintained indefinitely. Many scientists took jobs abroad. In a survey of just over four-thousand scientists working abroad, approximately one quarter of them were working in the United States. However, another quarter of these scientists were listed as working in "other countries," which was of particular concern to Western powers.[93]

The Russian economy has improved significantly since the economic collapse of 1998. Under President Putin, the economy is far better than it was in 1992 and much of this success is due largely to the increasing prices of oil.[94] Yet even with this

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[90] Alibek and Handelman, *Biohazard*, 9.

[91] Glenn E. Schweitzer, *Swords into Market Shares* (Washington, D.C.: Joseph Henry Press, 2000), 147.

[92] Ibid, 148.

[93] ibid, 149.

[94] Dale R. Herspring ed., *Putin's Russia* (Lanham, MD: Rowman & Littlefield Publishers,2005), 122.

improvement, concerns about scientists leaving Russia for better jobs are still completely justified. "We must accept the reality that some will sell their dual-use technology skills for application at home and abroad, with concerns over misuse of these technologies taking a back seat to immediate economic needs."[95] The only way to guarantee the control of illicit technology is to hire these men in Western firms at a competitive salary. The hard part is identifying which individuals should be targeted for recruitment.

C. ROGUE STATES AND TERRORIST ORGANIZATIONS

Rogue states and various terrorist organizations were also eager to employ the weaponeers looking for new opportunities. Rouge states and terrorist groups generally operate on much tighter budgets than those of non-rogue states, so a BW program is ideally suited to their financial needs. BW are much less costly to produce than nuclear weapons, and such weapons can still have a devastating effect on a target population. BW also have an added advantage to rogue states because they are much more easily camouflaged than a chemical-weapon or nuclear-weapon facility. The high-tech equipment can be bought on the open market and recent advances in the medical technology industry have made creating weaponized agents much easier and almost fully automated.

Iran has actively sought to recruit Russian scientists for its BW programs since 1998.[96] "The details of the Iranian overtures were vague and uncertain, although salary offers of $5,000 per month seemed unambiguous."[97] With a salary offer of $5,000 a month, there would be little incentive to stay in a job that only pays about $50 a month. Another entity that actively recruited Russian scientists was the Aum Shinrikyo cult based in Japan. This group was well funded and had the equipment to create both biological and chemical weapons at its compound in Tokyo. The finances of the Aum Shinrikyo cult, some $1.4 billion, dwarfed the entire nuclear-weapon program initiated by South Africa at only $200 million.[98] The leader of Aum Shinrikyo, Shoko Asahara, sought Russian expertise in obtaining chemical and biological weapons:

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[95] Schweitzer, *Swords into Market Shares,* 150.

[96] Ibid, 140.

[97] Ibid, 140.

[98] Peter R. Lavoy, Scott D. Sagan, and James J. Wirtz, *Planning the Unthinkable: How New Powers Will Use Nuclear, Biological, and Chemical Weapons* (Ithaca, NY: Cornell University Press, 2000), 206.

> Asahara used Russia as a supermarket for acquiring military equipment and training. He also sought recruits among Russia's scientific elite. Minister of Defense Pavel Grachev apparently paved the way for three groups of Aum Shinrikyo cult members each to spend three days with military units in the Taman and Kantemirov Divisions, where they were trained to use military equipment for a fee.[99]

Aum Shinrikyo had a large facility that produced chemical and biological weapons. This facility created anthrax spores for use on public targets and even released them. Fortunately, one of Asahara's biologists had a guilty conscience and cultured a non-virulent strain of anthrax for their BW program. "Aum had intended to kill hundreds or even thousands of people in these biological attacks, but all of them failed because the strain grown by the scientists was nonlethal, the dissemination technique failed, or both."[100] The cult disintegrated after the arrest of Asahara following the Sarin gas attacks on the Tokyo subway system. There are reports that a large group of Aum supporters remain in Russia and are employed at nuclear and weapons facilities throughout the country such as Krasnoyarsk-29.[101] It was only by luck that the attacks failed, and Aum is apparently in a position to commence its activities if the reports of Russians still involved in the cult are correct.

D. HOW INTELLIGENCE CAN HELP

How can intelligence help reduce or eliminate the threat of proliferation from scientists seeking a better life for themselves and their families? Human intelligence (HUMINT) is a definite requirement to help track these people. Even though the most famous and most talented scientists are safely employed in the West or are easy to monitor because of their high profile, the mid-level scientists that worked at suspected BW facilities in Russia must also be watched. Dossiers on the current scientists at these BW facilities should be gathered to monitor these people. Along with these dossiers, intelligence organizations must be aware when potential recruiting agents from suspect countries or terrorist organizations attempt to recruit these BW scientists. For scientists who are already working in another country, the social circles that the top weapon-program managers populate must be monitored closely. People tend to congregate in a

99 Lavoy, Sagan, and Wirtz, *Planning the Unthinkable*, 206-207.

100 Ibid, 208.

101 Ibid, 210.

social circle of people with the same abilities and backgrounds. This would be a crucial technique for keeping tabs on known weapons engineers and locating new people involved in rogue-state weapons programs. All of this HUMINT is difficult to manage, time consuming, and dangerous to the agents involved in the collection activity. HUMINT is the best way to monitor these scientists, but the time required to monitor programs and individuals successfully is immense.

Imaging Intelligence (IMINT) also called "geospatial intelligence" is useful in locating suspect facilities but is very limited beyond that capability. Knowing the location of a suspected weapons facility for targeting purposes is essential. But the true use of the facility can never be gleaned by IMINT alone. Using IMINT to cue the HUMINT collectors could be quite useful when the location is in the open, as the facilities in the former Soviet Union were. Unfortunately, adversaries are quickly learning to create underground facilities hidden away from satellites. Current commitments on national resources severely limit the ability of IMINT platforms to locate or even to monitor suspected weapons facilities when they are currently used for time-sensitive tactical information.

Signals intelligence (SIGINT) is of even more limited use than IMINT. The definition of SIGINT follows:

> Signals intelligence consists of several categories. Communications intelligence (COMINT) is directed at the analysis of the source and content of message traffic. While most military communications are protected by encryption techniques, computer processing can be used to decrypt some traffic, and additional intelligence can be derived from analysis of patterns of transmissions over time. Electronic intelligence (ELINT) is devoted analysis of non-communications electronic transmissions. This would include telemetry from missile tests (TELINT), or radar transmitters (RADINT).[102]

Because of recent disclosures in open source on collection methods, states and terrorists have taken care to limit their exposure to SIGINT collection techniques. Presently, SIGINT is also narrowly focused to aide in tactical operations, much like the IMINT platforms. Alibek frequently mentions talking openly on non-secure lines about Soviet

[102] FAS, "SIGINT Overview," http://www.fas.org/spp/military/program/sigint/overview.htm (accessed September 2, 2006).

programs and facilities. Something like that would have to happen today to obtain useful information via SIGINT about weapons programs or scientists that are working on the programs.

Anyone researching this topic will find a vast deficit of information on organizations keeping track of potential weaponeers. However, just because there was a lack of evidence in this area, does not mean that watchdog groups are not surveiling and monitoring high-and medium-profile persons of interest. The lack of data does suggest that if a database exists, then it is difficult to access, making it highly difficult to locate information about potential risks. Organizations like the Federation of American Scientists (FAS), Globasecurity.org, and the BioWeapons Prevention Project have plenty of information on the effects of biological and chemical agents, and they also have plenty of information on international treaties. However, they lack any real depth of knowledge of individuals who are capable of creating or supporting a weapons program other than potential rogue states as a whole.

E. CONCLUSION

There has been extensive research on the economic situation of former BW designers in Russia. Just as much research has been done on the BW produced in the Soviet Union. Both the ability to create BW and the reasons weaponeers want to leave Russia are well known and understood. With all this background knowledge, there is still an enormous inability to identify exactly who and where these people may go. As long as rogue states like Iran and North Korea or terrorist organizations are willing to pay high wages for BW scientists' expertise, a risk of proliferation will remain high. U.S. intelligence agencies cannot monitor or manage this situation alone. Presently, the focus is very narrow, aimed at mainly Iraq on what is considered important intelligence. Potentially disgruntled or economically disadvantaged scientists fall well outside the current focus. This is where the international regime of the BTWC must work with Russia and Western states to uncover and to monitor potential proliferators. Even if states abandoned their BW programs, the dual use of pharmaceutical technology will always be available. As long as countries are willing to develop weapons of mass destruction, this threat will always exist.

To watch everyone at risk for potential solicitation by organizations with suspect intentions is impossible. However, expanding the level of current knowledge about who must be under surveillance is possible. Currently, the information deficit on who to monitor is huge, but with just a little work at least a baseline reference of information on potential risks could and should be developed.

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V. CONCLUSION

A. FINDINGS

Biological weapons pose a threat equal to or greater than that of nuclear or chemical weapons. Although BW do not possess the instantaneous destructive power of nuclear weapons, they do have the potential to kill a vast amount of people and still leave infrastructure in tact, which ironically can make them desirable strategic weapons. Nuclear and chemical weapons are both very predictable in their consequences after their release. Biological weapons are living organisms that can mutate, making them unpredictable at best and unstoppable at worst. The United States must face the reality that these weapons exist and action must be taken to assess who is developing BW and what their program entails. By analyzing the United States reaction (or lack thereof) to the Soviet Union's development of a large-scale BW program, the United States may be better prepared to anticipate future BW threats.

Obviously, in the early days of the Soviet Union, the United States dismissed the Soviet's abilities in the biological sciences because of their apparent lack of a scientific method. Trofim Lysenko, a Stalinist pseudo-scientist, required Leninist propaganda to be woven throughout the scientific discourse. Leninist idealism was required in doctoral dissertations in all branches of science, which arguably detracted from the quality of the research. Lysenko's theories on genetics further delayed the development of biological sciences in the early years of the Soviet BW program. For Lysenko, Mendelian genetics were reactionary and tantamount to supporting Western ideology. Because of his close relationship with Stalin, Lysenko had drastically altered the course of Soviet science even through the Khrushchev era. As a result, the United States was highly skeptical of Soviet scientific efforts in the BW arena.

This skepticism was not helped by the secrecy and security established within the Soviet Union to hamper foreign intelligence agencies from gathering the relevant information needed to assess the BW threat accurately. Internal passports and closed cities made infiltration by agents very difficult. Biological weapons laboratories were even masked as sanitariums. Tight security practices also restricted publication of

research in scientific journals within the Soviet Union. Without these journals it was difficult to assess the level of progress made in the biological sciences. Moreover, it did not help matters that the CIA and other U.S. intelligence agencies were primarily focused on nuclear and conventional forces.

Accidental releases of BW agents in the Soviet Union should have been a major red flag for the U.S. intelligence community. The smallpox epidemic in Aralsk did not alert the intelligence community or the World Health Organization. Both organizations missed it. The next major accident was a release of anthrax in the city of Sverdlovsk. This release affected more Soviet citizens than the smallpox epidemic and killed hundreds of animals in the area as well. U.S. intelligence did not detect this incident quickly, but they did at least notice it. The first bits of information regarding the release made it to British intelligence and then filtered to U.S. intelligence through hearsay. Even after the anthrax was documented as pulmonary anthrax, the United States did not react in a manner that would suggest it was particularly concerned. The first CIA reports seemed to give the Soviet explanation the benefit of the doubt when they explained the outbreak as a result of infected meat sold on the black market. Curiously, this stance does not mimic the constant stance of distrust the United States held toward anything the Soviet government issued.

The United States missed the Soviet BW program because it did not see the program as a real threat. The United States made erroneous assumptions about its adversary based on its own practices on BW. In 1961, the CIA created the largest report on the Soviet BW program, but most of the report was only speculation at the Soviets' capabilities, and the report downplayed any threat that the Soviet Union might pose regarding BW. In the following twenty years, the attention of BW faded even further into the background. National intelligence estimates barely scratched the surface. There was a presumption that the Warsaw Pact countries (including the Soviet Union) were parties to the Geneva Protocols and therefore posed no BW threat. Mirror imaging can be a powerful inertia to overcome in the intelligence community and must always be kept in mind. Just because one side opens up and reveals all its cards, does not mean the opponent will do the same.

Other than monitoring the major signatures of a BW program (e.g. scientific discourse, outbreaks, and policy), the smaller signatures should be monitored as well. The personnel who comprise a BW program must be surveyed through intelligence gathering efforts. With the collapse of the Soviet Union, many secret military programs lost their funding, leaving many of the scientists working at these facilities in an economic and professional lurch. Certainly, the proliferation of BW agents produced in these facilities is a serious concern with the breakdown of security in the Soviet Union, yet the real threat is the knowledge involved in creating these BW agents. Under the Soviet regime, these scientists were accustomed to a higher standard of living than many other citizens of the Soviet Union, and in less than a year their lives were changed forever. They were no longer favored for housing and in many cases lost their salaries. Many of these scientists were left with no income to provide for their families, but other states were willing to offer employment to bolster their own BW programs. How many of these former Soviet bioweaponeers accepted offers from foreign governments to help implement viable BW programs is uncertain. Doubtlessly, they will follow a path that allows them to provide for themselves and their families. Hopefully, this path will lead them to find cures for disease and not methods to enhance disease or advance worldwide calamities.

The United States could improve the chances that these scientists are employed to better help humanity rather than to help a rogue state develop the means for advanced BW. Since the events of 9/11 immigration policies have tightened their criteria for entry into the United States. The United States could also provide incentives to pharmaceutical companies to employ these experts and thereby remove some of the red tape involved in their immigration to the United States. To be sure, skilled biologists and geneticists are invaluable in the pharmaceutical industry. Pharmaceuticals are one of the fastest growing industries and salaries are increasing. With their employment in this lucrative industry, two problems are solved. The unemployed scientists would have a salary commensurate with or better than their salary under the Soviet regime, and it would concurrently eliminate a potential proliferation concern.

Detecting BW programs will only become more difficult in the future, as more advances in biotechnology surface. The required equipment to make BW was once large

machines that required industrial space and power. Now the equipment to make BW can be found on the Internet for several thousand U.S. dollars and can be set up in a spare bedroom, drawing less power than many kitchen appliances.

The dual-use enigma of BW also increases the difficulty of finding BW operations, and again this difficulty will only become more challenging in the future. Every state has the right to create medicines and vaccines to increase the living standards of its people. Unfortunately, not all states have their people's best interest in mind when biotechnology facilities are established. The same equipment that is used to extend life and to find cures for humankind can also be used to create and to concentrate disease to be used as weapons.

In November 2001, President Bush directed the administration to implement an inspection regime for BW. This coincided with the meeting of the "Ad Hoc Group," a diverse group of countries dedicated to strengthening the verification processes within the BTWC. Progress associated with the BTWC and the Ad Hoc Group was soon halted when the United States objected to some of the inspection criteria. Statements concerning BW from the U.S. policy makers came to a halt shortly after requests to inspect U.S. pharmaceutical plants were made. Biological weapons were again generalized with other weapons of mass destruction as a whole. The explanation: the United States was unwilling to allow foreign inspectors entry to oversee potentially proprietary technology in biotechnology firms. The risk of losing a patent on a process for creating medicine is nothing compared to the risk of allowing a state to continue to hide its BW activities. Without U.S. support on the inspection regime, the United States will be suspected, offering little incentive for cooperation abroad. If the United States is unwilling to honor inspections, why should any other state allow itself to be questioned in kind? It is time to risk the loss of a patent in return for a robust inspection regime to combat the proliferation of BW.

Healthy skepticism is needed today to oversee the potential BW proliferators. Do they have the facilities to create BW? Are they hiring experts in the biotechnology field? Are they hiring former Soviet scientists? Are they obtaining equipment that could be used in a BW program? These are the questions that U.S. intelligence must consider

when evaluating a potential adversary in the future. Further, inspection regimes must be bolstered by all parties to the BTWC. The CWC has a robust inspection regime that could serve as the basis for inspections in the BTWC. The great powers in the world, such as the G8 nations, must agree upon inspection standards as an example to the other nations in the world. The threat of naturally occurring pandemics is great enough today. All nations must be committed to preventing the outbreak of a BW pandemic for all time.

B. TOPIC FOR FURTHER RESEARCH

Recently data on BW programs around the world have become available for review. The majority of the declassified documents remain sanitized, hiding valuable data. When the remainders of these documents are declassified, even more information may be available and may further illuminate the extent of U.S. knowledge of the Soviet BW program.

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